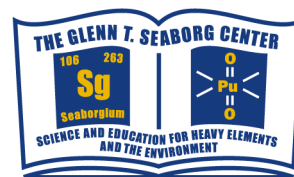




Glenn T. Seaborg Center Seminar



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Developing Actinide Selective Ligand Systems for Use in Applications

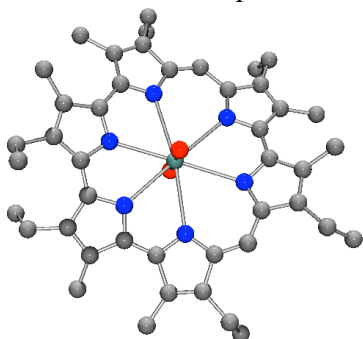
Wednesday, November 5, 2003

4 pm

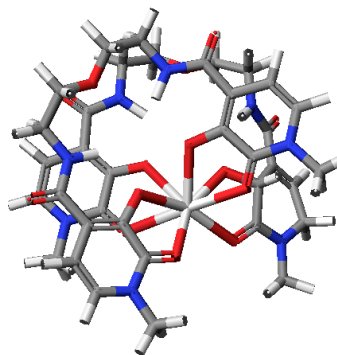
Building 2-100B

Abstract: The use of nuclear fuels for the production of electricity is hindered by significant waste management risks, making the optimization of process chemistry and the management of radioactive waste materials environmental issues of tremendous importance. Addressing these concerns are efforts to achieve the separation and isolation of radioactive elements, including both actinide cations and pertechnetate anions. This creates a need for novel systems capable of coordinating these radioactive metal ions with high specificity. In this presentation, research will be presented describing two different approaches to the development of new ligand systems for use in actinide extraction and sensing.

The porphyrins have been recognized as being excellent cation complexation agents, leading to the consideration that these ligands or modified analogs, might aid in developing systems for the recognition and reduction of radioactive wastes containing neptunium, plutonium, and americium in various oxidation states, as well as pertechnetate anions. In another approach, the similarities in the chemical properties of Fe(III) and Pu(IV) inspired a biomimetic approach to the development of multidentate sequestering agents for Pu(IV) based on siderophores, naturally occurring selective Fe(III) sequestering agents. Each of these multifaceted projects explore organic synthesis and novel ligand design in addition to selective metal coordination chemistry, and provide information of a fundamental nature that could be used to generate improved waste remediation or decontamination processes.



Molecular model from crystallographic data of
Np(V) (NpO_2^+) complex of isoamethyrin.
(hexaphyrin(1.0.1.0.0.0)).



Cache[□] molecular model of Pu(IV)-
5LIO(Me-3,2-HOPO) complex from the
crystal structure of the Ce(IV) complex.